WHAT IS CLAIMED IS:

1. A focus monitor method comprising:

preparing a mask comprising a first and second focus monitor patterns and an exposure monitor pattern, the first and second focus monitor patterns being used to form first and second focus monitor marks having dimensions variable depending on a defocus amount on a wafer, a defocus amount dependency of dimension of the first focus monitor mark being different form a defocus amount dependency of dimension of the second focus monitor mark, and the exposure monitor pattern being used to form exposure meters having dimensions variable depending on an effective exposure on the wafer;

obtaining a exposure dependency of a relationships between a dimensions of the first and second focus monitor marks and the defocus amount;

forming the first and second focus monitor marks and exposure monitor marks on the wafer by using the mask;

measuring a dimension of the exposure monitor marks to obtain an effective exposure;

selecting a relationship between the dimensions of the first and second focus monitor marks and the defocus amount corresponding to the effective exposure in accordance with the obtained effective exposure and the exposure dependency of the relationships between

the dimension of the first and second focus monitor marks and the defocus amount;

measuring a dimension of the first and second focus monitor marks; and

obtaining a defocus amount in accordance with the measured dimensions of the first and second focus monitor marks and the relationship between the dimension of the first and second focus monitor marks and the defocus amount corresponding to the effective exposure.

2. The focus monitor method according to claim 1, wherein

the first monitor pattern is constituted by a first opening surrounded by a shielding portion or constituted by the shielding portion surrounded by the first opening;

the second monitor pattern which is constituted by a second opening surrounded by a translucent film or constituted by the translucent film surrounded by the second opening, and is capable of giving a phase difference to an exposure light passing through said translucent film relative to an exposure light passing through said second opening; and

the relationship between the dimensions of the first and second focus monitor marks and the defocus amount is a relationship between a difference or a ratio between a dimension of the first monitor

pattern and a dimension of the second monitor pattern and the defocus amount.

3. The focus monitor method according to claim 2, wherein the first and second monitor patterns each have a shape wherein both end portions are tapered along one direction with respect to a central portion thereof.

4. The focus monitor method according to claim 2, wherein a difference L between the dimension of the first monitor pattern and the dimension of the second monitor pattern, a defocus amount F, and an exposure E are expressed by

$$\mathbf{L} = \sum_{n=0} a_n E_n * F + \sum_{n=0} a'_{n=0} E^n ,$$

where "a" represents a coefficient and "n" represents an integer.

5. The focus monitor method according to claim 1, wherein

the first pattern monitor pattern is constituted by a first translucent film surrounded by a first opening portion or constituted by the first opening portion surrounded by the first translucent film, and is capable of giving a first phase difference to an exposure light passing through said first translucent film relative to an exposure light passing through said first opening,

the second pattern region comprises at least one second monitor pattern which constituted by a second

translucent film surrounded by a second opening portion or constituted by the second opening portion surrounded by the second translucent film, and is capable of giving a second phase difference different from the first phase difference to an exposure light passing through the second translucent film relative to an exposure light passing through said second opening, and

the relationship between the dimensions of the first and second focus monitor marks and the defocus amount is the relationship between a difference or a ratio between a dimension of the first monitor mark and a dimension of the second monitor mark and the defocus.

6. The focus monitor method according to claim 5, wherein the first and second monitor patterns each have a shape wherein both end portions are tapered along one direction with respect to a central portion thereof.

7. The focus monitor method according to claim 1, wherein the exposure monitor pattern including a plurality of blocks intermittently or continuously arranged in one direction each including a shield portion and transmission portion arranged in a constant width p incapable of being resolved in a projection exposure apparatus in the direction and having a monotonously changing dimension ratio of the shield portion to the transmission portion of the block in the direction.

8. The focus monitor method according to claim 7,

wherein,

a Pitch P into which the width p converted by a dimension on the substrate is expressed by

$1/P \geq (1+\sigma)NA/\lambda$,

where "λ" represents wavelength of an light source of the projection aligner apparatus, "NA" the number of openings on the side of the substrate of an optical system, and "σ" represents a coherent factor; and

dimensional measurement is measurement for a length of an array direction of the blocks.

9. The focus monitor method according to claim 5, wherein a difference L between the dimension of the first monitor pattern and the dimension of the second monitor pattern, a defocus amount F, and an exposure E are expressed by

$$\mathbf{L} = \sum_{\mathbf{n=0}} \mathbf{a_n E_n * F} + \sum_{\mathbf{n=0}} \mathbf{a'_{n=0} E^n}$$

where, "a" represents a coefficient and "n" represents an integer.

10. A focus monitor method comprising:

preparing a first mask comprising a first and second focus monitor patterns, the first and second focus monitor patterns being used to form first and second focus monitor marks having dimensions variable depending on a defocus amount are formed on a wafer, a defocus amount dependency of dimension of the first focus monitor mark being different form a defocus

amount dependency of dimension of the second focus monitor mark;

forming the first and second focus monitor marks on the wafer with a plurality of exposures;

obtaining a first relationships between a dimension of the first and second focus monitor marks and a defocus amount for each of a plurality of exposure dose;

obtaining a nonuniformity amount of the first relationships due to a variation in the exposure;

obtaining a second relationship between the first relationships and the exposure when the obtained nonuniformity amount is greater than a predetermined value;

preparing a second mask comprising third and fourth focus monitor patterns and an exposure monitor pattern, the third and fourth focus monitor pattern being used to form third and fourth focus monitor marks having dimensions variable depending on a defocus amount are formed on the wafer, a defocus amount dependency of dimension of the first focus monitor mark being different form a defocus amount dependency of dimension of the second focus monitor mark, and the exposure monitor pattern being used to form exposure meter having dimensions variable depending on an effective exposure on the wafer;

obtaining a third relationship between the

dimension of an exposure meter and the exposure;

forming the third and fourth focus monitor marks and the exposure meters on the wafer by using the second mask;

measuring the dimension of the exposure meter;

obtaining an effective exposure from the measured dimension of the exposure meter and the third relationship;

selecting a fourth relationship between the dimension of the third and fourth focus monitor marks and the defocus amount corresponding to the effective exposure from the obtained effective exposure and the second relationship;

measuring the dimension of the third and fourth focus monitor marks; and

obtaining a defocus amount in accordance with the measured dimension of the third and fourth focus monitor marks and the fourth relationship.

11. The focus monitor method according to claim 10, wherein:

the first and third monitor patterns is constituted by a first opening surrounded by a shielding portion or constituted by the shielding portion surrounded by the first opening,

a third and fourth monitor pattern is constituted by a second opening surrounded by a translucent film or constituted by the translucent film surrounded by the

second opening, and is capable of giving a phase difference to an exposure light passing through said translucent film relative to an exposure light passing through said second opening,

the relationship between the dimension of the first and second focus monitor marks and the defocus amount is the relationship between a difference or a ratio between the dimension of the first monitor mark and the dimension of the second monitor mark and the defocus amount, and

the relationship between dimension of the third and fourth focus monitor marks and the defocus amount are the relationship between a difference or a ratio between the dimension of the third monitor pattern and the dimension of the fourth monitor pattern and the defocus amount.

12. The focus monitor method according to claim 11, wherein the first and second monitor patterns each have a shape wherein both end portions are tapered along one direction with respect to a central portion thereof.

13. The focus monitor method according to claim 11, wherein a difference L between the dimension of the first monitor pattern in a first patter region and the dimension of the second monitor pattern in a second patter region, a defocus amount F, and an exposure E are expressed by

$$L = \sum_{n=0} a_n E_n * F + \sum_{n=0} a'_{n=0} E^n$$

where, "a" represents a coefficient and "n" represents an integer.

14. The focus monitor method according to claim 10, wherein

the first and third monitor patterns is constituted by a first translucent film surrounded by a first opening portion or constituted by the first opening portion surrounded by the first translucent film, and is capable of giving a first phase difference to an exposure light passing through said first translucent film relative to an exposure light passing through said first opening,

the second and fourth monitor patterns is constituted by a second translucent film surrounded by a second opening portion or constituted by the second opening portion surrounded by the second translucent film, and is capable of giving a second phase difference different from the first phase difference to an exposure light passing through the second translucent film relative to an exposure light passing through said second opening,

the relationship between the dimension of the first and second focus monitor marks and the defocus amount is the relationship between a difference or a ratio between the dimension of the first monitor mark

and the dimension of the second monitor mark and the defocus amount, and

the relationship between dimension of the third and fourth focus monitor marks and the defocus amount are the relationship between a difference or a ratio between the dimension of the third monitor pattern and the dimension of the fourth monitor pattern and the defocus amount.

15. The focus monitor method according to claim 14, wherein the first, second, third, and fourth monitor patterns each have a shape wherein both end portions are tapered along one direction with respect to a central portion thereof.

16. The focus monitor method according to claim 10, wherein the exposure monitor pattern including a plurality of blocks intermittently or continuously arranged in one direction each including a shield portion and transmission portion arranged in a constant width p incapable of being resolved in a projection exposure apparatus in the direction and having a monotonously changing dimension ratio of the shield portion to the transmission portion of the block in the direction.

17. The focus monitor method according to claim 16, wherein,

a Pitch P into which the width p converted by a dimension on the substrate is expressed by

$1/P \geq (1+\sigma)NA/\lambda$,

where "λ" represents wavelength of an light source of the projection aligner apparatus, "NA" the number of openings on the side of the substrate of an optical system, and "σ" represents a coherent factor; and

dimensional measurement is measurement for a length of an array direction of the blocks.

18. The focus monitor method according to claim 14, wherein the difference L between the dimension of the first monitor pattern and the dimension of the second monitor pattern, a defocus amount F, and an exposure E are expressed by

$$L = \sum_{n=0} a_n E_n * F + \sum_{n=0} a'_{n=0} E^n$$

where, "a" represents a coefficient and "n" represents an integer.

19. A mask comprising:

a device region wherein a device pattern is formed;

a first pattern region having at least one first monitor pattern which is constituted by a first opening surrounded by a shielding portion or constituted by the shielding portion surrounded by the first opening;

a second pattern region having at least one second monitor pattern which is constituted by a second opening surrounded by a translucent film or constituted by the translucent film surrounded by the second

opening, and is capable of giving a phase difference to an exposure light passing through said translucent film relative to an exposure light passing through said second opening; and

a third pattern region including a plurality of blocks intermittently or continuously arranged in one direction each including a shield portion and transmission portion arranged in a constant width p incapable of being resolved in a projection exposure apparatus in the direction and having a monotonously changing dimension ratio of the shield portion to the transmission portion of the block in the direction,

wherein one of the first pattern region and the second pattern region is formed at least in the device region.

20. The mask according to claim 19, wherein the first and second monitor patterns each have a shape wherein both end portions are tapered along one direction with respect to a central portion thereof.

21. A mask comprising:

a device region wherein a device pattern is formed;

a first pattern region comprises at least one first monitor pattern which is constituted by a first translucent film surrounded by a first opening portion or constituted by the first opening portion surrounded by the first translucent film, and is capable of giving

a first phase difference to an exposure light passing through said first translucent film relative to an exposure light passing through said first opening;

a second pattern region comprises at least one second monitor pattern which constituted by a second translucent film surrounded by a second opening portion or constituted by the second opening portion surrounded by the second translucent film, and is capable of giving a second phase difference different from the first phase difference to an exposure light passing through the second translucent film relative to an exposure light passing through said second opening; and

a third pattern region including a plurality of blocks intermittently or continuously arranged in one direction each including a shield portion and transmission portion arranged in a constant width p incapable of being resolved in a projection exposure apparatus in the direction and having a monotonously changing dimension ratio of the shield portion to the transmission portion of the block in the direction,

wherein one of the first pattern region and the second pattern region is formed at least in the device region.

22. The mask according to claim 21, wherein the first and second monitor patterns each have a shape wherein both end portions are tapered along one direction with respect to a central portion thereof.

23. A method for manufacturing a semiconductor device, comprising:

preparing the mask as defined in claim 19; and

transferring to a semiconductor substrate the device pattern formed in the mask.

24. A method for manufacturing a semiconductor device, comprising:

preparing the mask as defined in claim 21; and

transferring to a semiconductor substrate the device pattern formed in the mask.